

DERWENT-ACC-NO: 1992-376736

DERWENT-WEEK: 199246

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TITLE: Mfr. of diamond coated ceramic component - comprises etching machined silico nitride using hydrogen fluoride or hydrogen fluoride and inert gas and forming gas phase synthetic diamond surface layer

PATENT-ASSIGNEE: MITSUBISHI MATERIALS CORP[MITV]

PRIORITY-DATA: 1991JP-0059619 (March 1, 1991)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 04276077 A	October 1, 1992	N/A	004	C23C 016/26

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 04276077A	N/A	1991JP-0059619	March 1, 1991

INT-CL (IPC): C04B041/91, C23C016/02, C23C016/26, C30B029/04

ABSTRACTED-PUB-NO: JP 04276077A

BASIC-ABSTRACT:

Mfr. comprises, etching the surface of silicon nitride using HF gas; and forming the gas phase synthetic diamond phase on the etched surface. The etching medium is pref. a mixt. of aq. HF and aq. halogenated hydrogen, or of a mixt. of HF gas and inert gas.

USE/ADVANTAGE - A diamond coating is formed on the ceramic material having good anti-peeling characteristic. In an example, a commercially available silicon nitride (Si3N4-5 wt.%Y2O3-3wt.%Al2O3) was machined to prepare specimen of the shape of ISO SPGN120308. The specimen was dipped into aq. 5% HF for 10min. to etch. The dried etched specimen was heated by W filament in a quartz tube (120 mm length) to 800 deg.C to 30 hrs. in the gas of CH4/H2=0.01, 20Torr to form the diamond film (12 micron thick) on the surface. The prepd. specimen was used as cutting tool to test for dry milling at 2 mm of cutting depth on a work of Al-18%Si. The tool gave superior surface precision on the work as long as 49 min. of continuous cutting.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: MANUFACTURE DIAMOND COATING CERAMIC COMPONENT COMPRIZE ETCH
MACHINING SILICO NITRIDE HYDROGEN FLUORIDE HYDROGEN FLUORIDE INERT
GAS FORMING GAS PHASE SYNTHETIC DIAMOND SURFACE LAYER

ADDL-INDEXING-TERMS:
CARBON@

DERWENT-CLASS: E36 L02 M13

CPI-CODES: E31-N03; L02-H04; L02-J02;

CHEMICAL-CODES:

Chemical Indexing M3 *01*
Fragmentation Code
C106 C810 M411 M720 M903 M904 M910 Q451 Q464
Specific Compounds
01776P
Registry Numbers
92407

UNLINKED-DERWENT-REGISTRY-NUMBERS: 1712S; 1776P

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1992-167226

DERWENT-ACC-NO: 1992-368535

DERWENT-WEEK: 199245

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TITLE: Ceramic cutting tool with anti-peeling composite diamond coating - comprises ceramic base with intermediate amorphous carbon film contg. fluorine and hydrogen and vapour phase-synthesised diamond film

PATENT-ASSIGNEE: MITSUBISHI MATERIALS CORP[MITV]

PRIORITY-DATA: 1991JP-0047593 (February 20, 1991)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 04268076 A	September 24, 1992	N/A	006	C23C 016/22

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 04268076A	N/A	1991JP-0047593	February 20, 1991

INT-CL (IPC): B23B027/14, C23C016/22, C23C016/26, C30B029/04

ABSTRACTED-PUB-NO: JP 04268076A

BASIC-ABSTRACT:

Ceramic base material is coated with intermediate layer of amorphous carbon film contg. 1-30at.% of F and 1-30at.% of H, and is further coated by gas phase-synthesised diamond film. The intermediate layer is pref. 0.1-10 micron thick. The ceramic base material is pref. a silicon nitride ceramic.

USE/ADVANTAGE - Provides excellent cutting tool having high anti-peeling, composite diamond coating.

In an example, a commercial silicon nitride ceramic material was machined to form a tip conforming to ISO SPGN 120308. The tip was etched to prepare the base material of Si2N4-5%Al2O3 under the condition of 0.05Torr, 100W of RF power, CF4 gas, 50 sccm gas flow rate, and 20min. treatment. The tip was then subjected to amorphous carbon film synthesis under the condition of 0.2Torr, 80W of RF power, CH4 + 20%HF, 20 sccm of gas flow rate. The amorphous carbon film was further coated by the gas phase synthesis diamond film 5 microns thick in microwave plasma unit under the condition of 30Torr, 600W of microwave power, 1%CH4 + H2, and 100 sccm gas flow rate. The prep'd. tip was used as the cutting tool for dry milling under the condition of Al-18%Si of work, 500m/min. cutting speed, 0.5mm cutting depth, and 0.3mm/rev. feed. The peeling of diamond film occurred after 36min. of cutting.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: CERAMIC CUT TOOL ANTI PEEL COMPOSITE DIAMOND COATING COMPRIZE
CERAMIC BASE INTERMEDIATE AMORPHOUS CARBON FILM CONTAIN FLUORINE
HYDROGEN VAPOUR PHASE SYNTHESIS DIAMOND FILM

DERWENT-CLASS: L02 M13 P54

CPI-CODES: L02-F05; L02-H02B2; L02-J02C; M13-E02;

UNLINKED-DERWENT-REGISTRY-NUMBERS: 0323S; 1532U ; 1712U ; 1776P

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1992-163660
Non-CPI Secondary Accession Numbers: N1992-280904